Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Planet: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Planetary Base Design**

Challenge: Design a planetary base for a specific planet that protects its inhabitants from the physical features of that planet.

**Task #1:** Choose a job.

\_\_\_\_/5: Both employers communicated well and did their jobs (this will be an individual grade).

**Task #2:** Is the gravity on your planet less or more than that on Earth?

\_\_\_\_/5: all questions are answered.

**Task #3:** Research interesting facts and physical features of your planet.

\_\_\_\_/10: all questions are answered

**Task #4:** Identify problematic features of the planet and figure out an engineering solution to those problems.

\_\_\_\_/16: there are four identified problematic physical features and a structural engineering solution for each.

**Task #5:** Draw a sketch of your space station. Answer questions, rough draft, and final.

\_\_\_\_/8: Drawing in neat, easy to understand, and it has at least 7 labels.

**Task #6:** Plan and present your project.

\_\_\_\_/1: Spoke clearly

\_\_\_\_/7: Talked about all points listed in “task #5”

**Task #7:** Peer Review Form

**Total:** \_\_\_\_\_/\_\_\_\_\_\_\_

**Task #1:** Choose a job.

Directions: Choose a job. If it is difficult to decide, do “rock, paper, scissors” with a third person as the referee.

**Employer “A”: Researcher & Communications Specialist**

1. Participate in the research for the project
2. Write the labels/key for the drawing
3. Develop the presentation (with the help of Employer “B”) while Employer “B” is making the final drawing.
4. Presenter “A”

**Employer “B”: Researcher & Architect**

1. Participate in the research for the project
2. Draw the final drawing of the Planetary Base
3. Assist Employer “A” in writing the presentation while completing the final drawing. (As you draw, you can talk with your partner about what you both should say in the presentation).
4. Presenter “B”

**Task #2:** Is the gravity on your planet less or more than that on earth?

Directions:

1. Stand in one spot with both feet on the floor.
2. Make one jump, as far as you can, and land on both feet.
3. Ask your partner to help you measure the length of your jump.
4. Repeat steps 1-3 for your partner and calculate the average length of both jumps.

|  |  |
| --- | --- |
| What to do | Distance jumped |
| First persons jump | cm. |
| Second persons jump | cm. |
| 1st jump + 2nd jump = | \_\_\_\_\_\_\_\_\_\_\_\_cm. |
| Answer above ÷ 2 = | \_\_\_\_\_\_\_\_\_\_\_\_cm. (Average Jump on Earth) |

1. Now use your average jump distance and the chart on the board. Calculate how far you could jump on your planet.

|  |  |  |  |
| --- | --- | --- | --- |
| **Planet Name** | **AVERAGE jump on Earth** | **Relative gravity of this planet** | **Length of jump on this planet** |
|  |  |  |  |

1. Answer the following questions:
   1. We jumped an average of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm on Earth.
   2. We jumped an average of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(name of your planet).
   3. We would jump a shorter/longer distance on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(name of your planet).
   4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(name of planet) has more/less gravity than Earth.

**Task #3:** Research interesting facts and physical features of your planet.

Directions: Answer every question.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(name of your planet) is the 1st /2nd /3rd /4th /5th /6th /7th /8th /9th (circle one) “planet” from the sun.
2. What is the average temperature on your planet? \_\_\_\_\_\_\_\_\_\_\_\_\_\_°F
   1. Is this temperature higher or lower than the average temperature on Earth?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Does your planet have a solid surface or is the planet mostly made of gas?\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Length of day\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Length of year\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Circle all that apply: (every planet has 2)

a) Hot enough to melt lead b)Has thousands of rings c)The windiest planet

d)Once had liquid water(but not now) e) Has four large moons

f)The smallest planet g)A planet that spins on its side h)The largest planet

i)Its year is about 88 days long j) Has over 27 known moons

k)Similar to Earth’s size and mas l)It looks blue because of methane in its atmosphere

m)It looks red because of iron oxide(rust)

n)Least dense of all the planets (this means it could float in water)

1. Three additional interesting facts:
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Task #4:** Identifying problematic features of the planet and figuring out an engineering solution to those problems.

Directions:

1. Put a star next to the physical features that will affect a space station on that planet.
2. In the chart below, write the physical feature of the planet in one column and how you will adjust the structure/feature of your space station to accommodate the planet in the other.
   1. (Hint: What fact would make it difficult to build a space station on that planet…ex. Extreme temperatures, windy conditions, no land etc.)

|  |  |
| --- | --- |
| Problematic Physical Feature | Engineering solution |
| Example: high temperature | * Use the heat and convert it for energy for the space station * Thick walls with special material on outside to keep the building at a safe/comfortable temperature. |
|  |  |
|  |  |
|  |  |
|  |  |

**Task #5:** Draw a sketch of your space station: Answer questions, rough draft drawing, and final drawing.

Directions:

1. Answer the questions below.
2. On a separate sheet of paper, draw a rough draft of your planetary base.
3. Draw a final draft of the planetary base on the poster board provided.
   1. Final drawing must be labeled: identifying the answers to the three questions and the four ways to solve the challenges of the planet’s physical features.

Questions:

1. Where will the people get their food?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What will be the people’s water source?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What will be the energy source for the space station? (example: sunlight, heat, wind, etc.)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Final Planetary Base Drawing**

\_\_\_\_\_\_\_/1: Drawing is neat and easy to understand

\_\_\_\_\_\_\_/1: Name, class, and planet are written on the front of the drawing

\_\_\_\_\_\_\_/4: Labels or a key are included, one for each solution to the problematic physical features and three to show the answer to the questions above. (Total of 7 labels).

**Task #6:** Plan and present your project.

Directions: Plan your presentation for the class and include all of the points below.

1. Presenter A: One person will introduce the planet
   1. \_\_\_\_\_Name of planet
   2. \_\_\_\_\_Average temperature
   3. \_\_\_\_\_Solid ground or gas planet
   4. \_\_\_\_\_The two circled facts from your research page (task #2)
   5. \_\_\_\_\_State the four problematic features/facts (one at a time) and Presenter B will say how the space station solved those problems.
2. Presenter B: This person will state how the group’s space station design met the challenges of the plant.
   1. \_\_\_\_\_State and show on your drawing how your group solved the four problematic features/facts of your planet.
   2. \_\_\_\_\_State how you get your food, water, and where you get your energy for your base.